Dec. 9, 1958 J. GORDON 2,864,019

ELECTRICAL BRUSH HOLDER

Filed May 10, 1957

Fig. 1

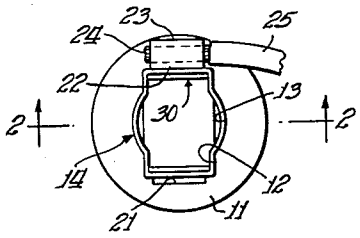



Fig. 2

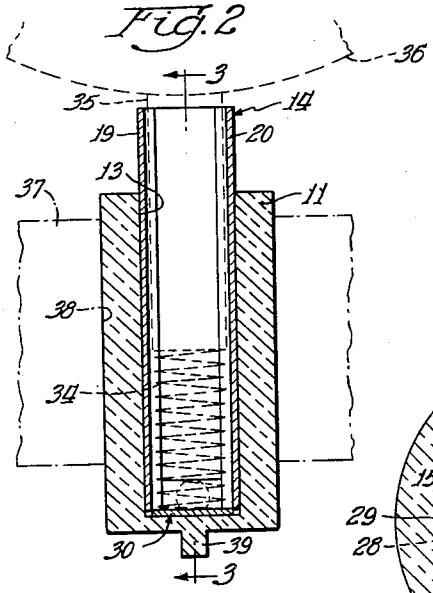



Fig. 7

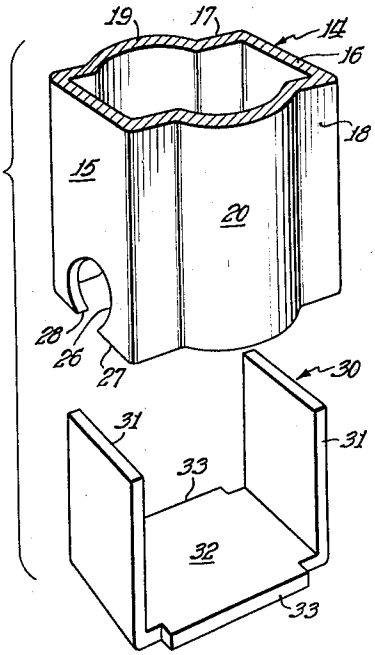



Fig. 4

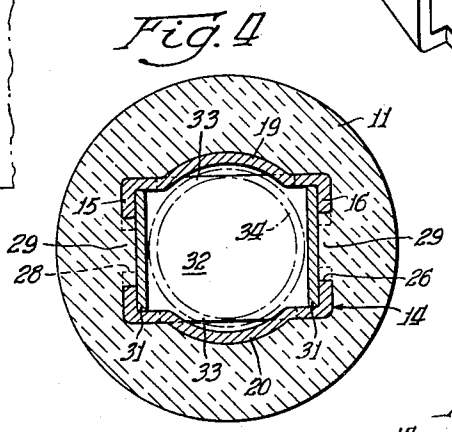



Fig. 3

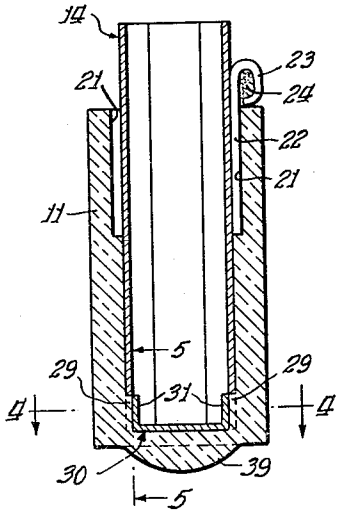



Fig. 5

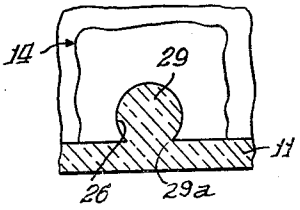
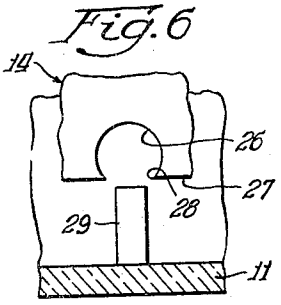



Fig. 6




Inventor:
James Gordon
By: Jones, Darbo & Robertson
Attys.

United States Patent Office

2,864,019

Patented Dec. 9, 1958



2,864,019

# ELECTRICAL BRUSH HOLDER

James Gordon, Chicago, Ill.

Application May 10, 1957, Serial No. 658,395

6 Claims. (Cl. 310—247)

This invention relates to electrical brush holder and aims to provide a simple and inexpensive holder that effects a positive interlock between the conductor sleeve and the insulating jacket therefor, the holder being advantageously inexpensively constructed so that if it be desired to replace a brush in a dynamo or motor the holder may be withdrawn and discarded, a new holder of the same type being then substituted for the new brush.

A further object of the invention is to provide such a brush holder having enhanced electrical contact expedients, the holder at the same time being adapted to receive a wiring member as desirably made in accordance with my Patent No. 2,303,836 of December 1, 1942.

Still a further object of the invention is to provide the brush holder with orienting means integral with the shell of the holder, the shell being advantageously constructed of thermo-plastic material such as nylon which has relatively high dielectric properties while possessing the capacity for good cold flow.

These and other objects and advantages will be apparent from the following description taken together with the accompanying drawing, showing an illustrative embodiment of the invention, and in which drawing—

Figure 1 is an end view of the brush holder embodying the present invention;

Figure 2 is an axial sectional view thereof in an illustrative installation and being a section of the holder taken on the line 2—2 of Fig. 1;

Figure 3 is a section rotated ninety degrees and taken on the line 3—3 of Fig. 2, the brush itself and spring therefor being omitted;

Figure 4 is an enlarged cross-section on the line 4—4 of Fig. 3, the spring being shown;

Figure 5 is a fragmentary section on the scale of Fig. 4 taken on the line 5—5 of Fig. 3;

Figure 6 is a view somewhat similar to Fig. 5 but showing the parts before final interlock; and

Figure 7 is an enlarged perspective view showing the proximal end of the sleeve and the shunt cap which is received therein, the view showing the parts separated before insertion of the cap.

Referring in detail to the illustrative construction shown in the drawings, the brush holder of the present invention comprises the jacket or shell 11 which is desirably molded of thermoplastic material, preferably nylon which has high dielectric properties and good cold flow capacity, the shell being exteriorly cylindrical and having a hollow interior or bore 12 that is generally rectangular in cross-sectional area but arcuately enlarged as at 13 at opposite sides thereof.

Telescopically received within the bore 12 is the metallic sleeve 14 which has a cross-sectional shape similar to that of the bore 13 in that it has opposite parallel sides 15 and 16 and other opposite sides 17 and 18, the sides 17 and 18 being each outwardly curved in an



axially extending intermediate area thereof as at 19 and 20 respectively to match the bore enlargements 13. The shape of the bore 13 and sleeve 14 just described is shown in my said patent as well as further slot-like enlargements of the bore at 21 for the reception of a metallic wiring member 22 which is inserted in scraping engagement with the sleeve 14, as best seen in Fig. 3, the metallic wiring member having a curled exposed termination 23 in which the bared end 24 of a conductor cable 25 may be soldered to establish an electrical connection between the cable and the metallic sleeve 14.

Further in accordance with the present invention, the proximal end of the metallic sleeve 14 is pre-notched as at 26 on both its sides 15 and 16, the notches 26 opening into the proximal end edge 27 of the sleeve. In this case, the notch 26 is desirably partially circular so as to have a mouth 28 which is smaller than the distance across the notch spaced from the mouth 28.

For cooperation with the notches 26, the inner or proximal end of the bore 12 of the shell 11 carries integral lugs 29 on its faces which lap the walls 15 and 16 of the sleeve 14, and these lugs are in axial alignment with the notches 26 in the sleeve so that when the latter is inserted into the shell the lugs 29 ride into the notches 26. The lugs are of an axial length initially longer than that of the notches 26 so that when the sleeve is pushed home into the shell from the position shown in Fig. 6, for example, to that shown in Fig. 5, the nylon material of the lugs 29 flows into somewhat bulbous shape under the pressure of the sleeve 14 and is molded, so to speak, into the shape of and substantially filling the notch so as to provide a positive interlock, as shown in the drawings, between the sleeve and the shell. The upset form of the lug as shown in Fig. 5 is somewhat bulbous in the sense that it has a restricted neck 29*a*.

Further in accordance with the present invention, before the sleeve 14 is put into the shell, the shunt cap 30 is inserted in the proximal end of the sleeve, this shunt cap being also metallic and having opposite legs 31 and a base 32 from which the legs extend. The base 32 in its dimension parallel to the legs is enlarged at each side as at 33, so that, when the legs 31 are inserted into the proximal end of the sleeve 14, the enlargements 33 of the base abut the end 27 of the sleeve 14 across the bulges 19 and 20 thereof and limit insertion of the shunt cap into the sleeve. At the same time, the legs 31 lap the notches 26 in the sleeve and, when the sleeve is pressed home into the shell, also lap the lugs 29 in the shell, as best seen in Fig. 3, thus advantageously confining the material of the lugs to cause it to flow in a direction which will fill the notch 29 for the purposes of effectuating the interlock already referred to. The shunt cap 30 may be inexpensively formed from a stamping which avoids any screw machine operations on the sleeve 14.

After the sleeve, with its shunt cap in place, is thus inserted in the shell and interlocked therewith, a light helical coil spring 34 is inserted in the sleeve in abutment with the base 32 of the shunt cap 30 and then the brush 35 is inserted in the sleeve in abutment with the spring 34 so that the spring urges the brush 35 outwardly of the sleeve at its distal end, and so that, as best seen in Fig. 2, the brush 35 may contact the surface 36 of the rotating commutator of an electrical machine, in brushing mechanical and electrical contact therewith, as is well known in the art. The brush is of a cross-section to snugly fill the sleeve except where the bulges 19 and 20 occur. The latter accommodate the shape of coil spring 34.

As is well known, the brush holder may be carried by a frame part 37 of the electrical device which has a

socket-like opening 38 therein of circular cross-section to snugly receive the cylindrical shell 11.

Still further in accordance with the present invention to assist in orienting the shell 11 in the opening 38 the shell is provided with an integral molded lug 39 on its proximal end by which it may be rotated in the opening 38, or in any suitable tool which injects it into the opening 38, so that the brush 35 is rectilinearly aligned parallel with the axis of the commutator 36.

So constructed and arranged, an inexpensive brush holder is provided which may be readily inserted or removed from its mounting, and which, when removed for replacement of the brush for example, may be discarded and thrown away and a new holder substituted, the cost of manufacture being such that this is not prohibitive. At the same time, a secure and efficient holder is provided in which the metallic conductive sleeve cannot come accidentally loosened and a good and positive electrical connection is made from the brush to the metallic sleeve and from the latter to the conductor cable 25, the spring 34 contributing to this electrical conductive capacity by providing a shunt path from the brush to the shunt cap 30 and through the latter to the sleeve 14, wiring clip 22, and wire 24.

An illustrative embodiment of the invention having been disclosed, in accordance with the statutes, it is to be understood that such changes may be made including modifications and additions as fall within the spirit of the invention or the scope of the appended claims.

What is here claimed is:

1. An electrical brush holder device, comprising, a shell of thermoplastic material, a metallic sleeve received within the shell, notches in opposite walls of said sleeve opening into its inner end each having a mouth of smaller diameter than the diameter of the notch spaced from its mouth, lugs on the inner walls of the shell registering with the notches and having an axial length greater than the length of the notch, whereby when the sleeve is pushed into the shell with the notches over the lugs and pressed home into the end of the shell, said lugs spread to fill the notches to provide positive interlock between the shell and the sleeve.

2. The structure of claim 1 wherein a metallic shunt cap is inserted in the inner end of the sleeve abutting the edges of said end between said notches, legs of the cap lapping the notches and said lugs.



3. The structure of claim 1 wherein the notches are a portion of a circle and the lugs are initially rectangular.

4. An electrical brush holder device, comprising, a shell of molded nylon material, a metallic sleeve received in one end of the shell, a notch in a wall of said sleeve opening into its inner end having a mouth of smaller diameter than the diameter of the notch spaced from said mouth, a lug on the inner wall of the shell registering with the notch and having an area greater than the area of the notch whereby when the sleeve is pushed into the shell with the notch over the lug and pressed home into the end of the shell, said lug spreads to fill the notch to provide a positive interlock between the shell and the sleeve.

5. An electrical brush holder device, comprising, a shell of plastic insulating material, a metallic sleeve received in one end of the shell, notches in opposite walls of said sleeve opening into its inner end by a mouth of smaller diameter than the diameter of the notch, lugs on the inner walls of the shell registering with the notches and having an axial length greater than the length of the notch whereby when the sleeve is pushed into the shell with the notches over the lug, and pressed home into the end of the shell, said lugs spread to fill the notch to provide a positive interlock between the shell and the sleeve, and an orienting lug molded on the proximal end of the shell externally thereof.

6. In an electrical brush holder, an insulating shell of non-metallic material, a metallic sleeve received within the shell, said sleeve at its inner end being cut away in the plane of the sleeve wall to provide a notch having a restricted mouth, the inner wall of the shell carrying a protuberance having a restricted neck lying in said notch in said plane and interlocked therewith to hold the sleeve in the shell.

**References Cited** in the file of this patent

UNITED STATES PATENTS

2,449,764 Bluemink ---------- Sept. 21, 1948